Hadra webbi,
Atherton Tableland Bicoloured Snails

METAMORPHOSIS

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Planning and Organization Meetings

A quarterly meeting is scheduled in order to plan club activities and the magazine. See BOIC Programme.

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Membership fees are $30 for individuals, schools and organizations.

Aims of the Organization

- To establish a network of people growing butterfly host plants;
- To hold information meetings about invertebrates;
- To organize excursions around the theme of invertebrates e.g. butterflies, native bees, ants, dragonflies, beetles, freshwater habitats, and others;
- To promote the conservation of the invertebrate habitat;
- To promote the keeping of invertebrates as alternative pets;
- To promote research into invertebrates;
- To encourage the construction of invertebrate friendly habitats in urban areas.

Magazine Deadlines

If you wish to submit an item for publication the following deadlines apply:
March issue – February 1st June issue – May 1st
September issue – August 1st December issue – November 1st
All articles should be submitted directly to the Editor daphne.bowden1@bigpond.com

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Cover Painting

Hadra webbi, Atherton Tableland Bicoloured Snails - Painting by Lois Hughes

FROM THE PRESIDENT

The winner of the club logo competition is Alan Hyman. Congratulations and thanks. I think our members will like it.

The mistletoe book has been well received with half of the first print run having already been sold. No doubt this misunderstood and ignored group of plants will now be getting the support it deserves.

If you missed the field trip to Pooh corner don't worry. There are more trips to come. Check out the programme.

We still need a secretary. If you can help with this, please let me know.

Happy Reading *Frank Jordan*

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A Slightly Slimey Tale – *Jill Fechner*

As a child of the 70s my backyard was a constant delight. Each summer tiny Eastern Bearded Dragons perched in our lemon tree. Our bushhouse was home to Eastern Sedge frogs tucked up in elkhorns. The bottlebrush was covered in what we called Jaffa butterflies but, given it was also a mistletoe host, they were actually 2 types of Jezebel butterflies. Much to my mother's horror, the garden was also home to many snails. Snail races on the wooden see-saw my grandfather made us were a fun pastime on lazy summer days, long before Pokemon was dreamt of.

Mostly though, snails ate Mum's favourite plants and, when discovered, met a crunchy end. These were the European Brown Garden Snail invaders, *Cornu aspersum*, introduced from Europe. They rapidly became a pest for crops and gardens.

Left - Pest species, the European Brown Garden Snail (*Cornu aspersum*), making trails. The young hoover calcium off the adult's shell, so I separate them as soon as I can.

Right - Another invader, the Asian Tramp Snail (*Bradybaena similaris*), is a serious pest for nurseries and market gardens.

It's funny how the things from our childhood call to us. A few years ago I began caring for injured reptiles and around the same time I also became a member of BOIC. It is wonderful to find kindred spirits who share a passion for the same things you do.

Part of my reptile care includes keeping invertebrates as a food source. I think it is important to keep the diet as close as possible to what they would get in the wild. Following the wet weather in the past few years, my garden would explode with feral snails and slugs so feeding recovering wild blue tongue and pink tongue skinks became easy. It also made them very happy patients as skinks love their food. If you have a feral snail problem in your garden please, please don't ever use snail bait. Think about what native frogs, lizards, and birds may be using them as a food source. You could also contact a local wildlife rehabilitation group who may be very happy to help you out. I know I am always willing to run around with a torch and collect them.

I began to research how to keep and breed snails to ensure a stable supply. In doing so I was amazed to discover that we had such a huge array of native snails and that you could purchase some species and keep them. I planned to get some, at some point, maybe when the reptile season slowed down.

Hadra webbi viewed from different angles

Last Christmas at our family gathering, my cousins asked if I would like a pair of rainforest snails plus their offspring. I think they were surprised with just how delighted I was. A week later they delivered 2 very large snails and about 17 tiny ones. More research later, I am the proud owner of *Hadra webbi*, Atherton Tableland Bicoloured Snails. They occur from Tully to Port Douglas in North Queensland and live in rainforest hiding under fallen trees and amongst leaf litter. The shell can be up to 61mm and is quite solid and heavy (Ref. 1).

Given that they come from up north and rainforest, it is an issue keeping them cool in our hot dry summers in the southeast corner of Queensland, a fact I very soon discovered. The adults are quite hardy but the tiny new snails succumb to heat and an over-abundance or lack of moisture. This species does best at 20-26 degrees with a humidity of 60-90%. They bury themselves to keep cool. In captivity I offer them mushrooms, cucumber, carrot, lettuce and sweet potato.

Hadra webbi size range of last hatchlings and view of the snail's body

I had only had them about a month when I found a new clutch of eggs laid in the substrate. Being hermaphrodites both males and females can lay eggs and indeed they

proceeded to lay 2 more clutches over the next month. The tiny hatchlings have one and a half whorls of delicate shell to start with so handling them is not easy. I use feeding tongs and a light touch to move them into takeaway containers punched with small holes for airflow and lined with a damp paper towel. I was soon over-run with babies; constantly keeping food up to them and cleaning out any old food, which is very important to contain mould growth. My learning curve was not fast enough and sadly I lost quite a few to heat stress and incorrect moisture levels. I found there is quite a high die-off rate in the hatchlings. I will be better prepared next season.

I moved the adults into a large glass enclosure with a deep layer of peat moss and another deep layer of sphagnum moss. I use Golden Cane frond ends (the part that wraps round the trunk) as hides. I also provide large branches for them to climb. It is a little disconcerting to hear them scraping with their thousands of tiny teeth along the cuttlefish that provides calcium for healthy shells. The natives do not seem to produce as much of a slime trail as the *aspersum*. Snails excrete one kind of mucus from the front of their foot and that is used to crawl on. Another kind of external mucus keeps their soft body from drying out. I still have 3 of the original offspring that are now about 40 mm and about 10 of the next clutches. I also found 2 friends with a keen interest and each has a pair.

A couple of months ago a friend asked if I would like the snails that were eating her mail in the letterbox, a problem I also had before I began collecting them for my feral breeding program. When she brought them over I discovered that they were not feral snails at all but native. I have now added a Fraser's Banded Snail (*Sphaerospira fraseri*) and several Pale Banded Snails (*Figuladra mattea*) to my menagerie. I still give them a bit of snail mail to digest. They really do love an envelope and what a great way to recycle paper.

Fraser's Banded Snail (*Sphaerospira fraseri*)

Pale Banded Snail (*Figuladra mattea*)

The *fraseri* is quite large. Its shell can reach a diameter of up to 56 mm. The shell ranges from a tawny yellow to dark brown base-colour with many black spiral bands and a dark area behind the outer lip. The snail is a dark grey to brown colour with a grey mantle. I need to find this one a friend.

The *mattea* have a pale, yellowish shell with many strong, dark brown spiral bands. This is also a reasonably large snail that can grow to around 35 mm in diameter. The snail is a very beautiful pinkish orange with a red mantle. It will be interesting to see if these breed when the weather warms up, though I have already found both new species very active compared to the *webbi* who are fairly dormant in the colder weather. Native snails are fairly low maintenance and are very interesting creatures to keep. I have become quite fond of mine and I can't imagine any of them becoming food while I have a constant supply of *aspersum* to offer hungry skinks.

I was lucky enough to attend a presentation to the Queensland Mycological Society by John Stanisic, 'The Snail Whisperer', and lead author of Australian Land Snails Volume 1. John is Australia's foremost expert on land snails. He held the position of Curator of Molluscs at the Queensland Museum for 26 years and is a very engaging speaker (Ref. 1). He also did a very interesting chat with Richard Fildler that is available online (Ref. 2).

Listening to him reinforced my belief in the importance of biodiversity. Invertebrates account for 99% of terrestrial diversity and of that 6% is snails. Australia has 2,500 - 3,000 species of snails. They evolved 220 million years ago and new species are still discovered every year. Snails are critical to keeping our forests healthy. They eat biofilm on leaves and rotting material on the forest floor. Their bodies decay and return calcium and nutrition to the soil. They have such a close association with the rainforest that they are excellent indicators of biological change. Many species are threatened with habitat destruction and forest degradation and fragmentation. Land snails are also food for birds including the Southern Cassowary and the Noisy Pitta, who use anvils to break open the shells of their favourite food. Jack Hasenpusch from the Australian Insect Farm sent me his observations from their lowland rainforest farm along with this photo of the shell of a *Hadra webbi* found in Southern Cassowary droppings. The dropping is made up of a lot of *Syzigium* fruit seed the bird had digested (Ref. 3).

The shell of a *Hadra webbi* found in Southern Cassowary droppings - Photo Jack Hasenpusch

Another excellent paper I came across is "Australian land snails: a review of ecological research and conservation approaches" by Jonathan Parkyn and David A. Newell. The abstract states "Land snails are an important yet often neglected component of Australia's biological diversity. Despite high levels of diversity within this group and the identification of many narrow range endemic species as being of conservation concern, there have been few detailed studies that document the ecology and conservation requirements of the group. A range of threats has been suggested, yet relatively few have been rigorously assessed. Whilst factors such as land clearing are readily apparent and have resulted in extinctions, other threats such as climate change are not well understood. This paper reviews studies conducted on terrestrial molluscs in Australia and highlights the need for further targeted ecological research, given the likely level of on-going threats. We urge researchers to apply rigorous approaches to data collection that will enable a deeper understanding of the factors governing distribution and abundance. Approaches used in other areas of conservation biology offer considerable scope for application to land snails and for the development of appropriate conservation strategies." (Ref. 4)

More of the Pale Banded Snail - trying pumpkin, exploring my hand, hoovering up some mail

Let's hope Australia does invest in further research and conservation of our precious land snails.

References

1. Australian Land Snails Vol. 1 page 462
2. http://www.abc.net.au/local/stories/2014/06/26/4033651.htm
3. http://www.insectfarm.com.au
4. http://www.tandfonline.com/doi/abs/10.1080/13235818.2013.782793

Photos, except where previously acknowledged, by Jill Fechner

Silken Cradles – *Densey Clyne*

Maggie in daytime retreat

A long time ago I shared my Sydney garden with a very special spider - *Ordgarius magnificus*, known in those days as *Dicrostichus magnificus*. I called her Maggie for short. The common name, Bolas Spider, is a misnomer. The wooden or leather *bolas* used as a weapon (or restraining device) in several cultures does not remain attached to the thrower but is let go and thrown clear. But the spider's technique is different. The sticky ball she whirls at her moth target remains attached to her by a silk thread that is used to haul in her catch.

I have written elsewhere and at length about this amazing spider's hunting technique and she was a leading lady in my documentary "Aliens Among Us". But there is another side to Maggie's life that is worth attention for the time and effort expended; it is the weaving of her egg sac. When I found a set of 3 completed egg sacs in my garden I knew there would be more to come and I was lucky enough to catch a female at work.

It was 8.30 in the evening and the spider had already woven a few silk strands as a base for the important inner sac, the 'nest' for her eggs. While I watched, she enlarged this into a small flimsy bag with an opening.

Starting the nest

Eggs are laid

Pressed against the opening she laid a batch orange-coloured eggs inside and closed the gap with more openwork silk. Now to hide the eggs she moved around and around weaving a dense white fabric with dabs from her spinnerets that I clocked at 90 per minute. That took about 10 minutes. By 8.50pm the eggs were obscured inside a 4cm long nest of fluffy silk overlaid by an opaque white covering.

Hiding the eggs

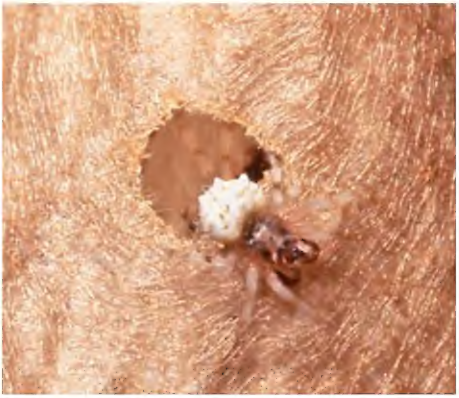
Weaving the insulation layer

By 9.10pm the spider was moving up and down weaving in place the layer of fluffy silk that would insulate the egg sac and also form its final spindle shape. I left her to it for a while and when I checked her at midnight she was weaving the final parchment-like cover that would proof the egg sac against bird beaks and rough weather.

If Maggie's rate of working was consistent, and my arithmetic is right, she would have dabbed with her spinnerets more than 18,000 times by midnight alone. At 1mm per dab (I'm being conservative) that adds up to a total silk length of 18 metres so no wonder she looked a little emaciated when I saw her next morning. And that was only one egg sac: this incredible spider can produce up to eight or nine in one season!

Completed egg sacs

When the spiderlings hatch it appears that one of them bites through the thick silk of the egg sac to make an escape hole for all of them. For the pinhead-sized male, the term 'spiderling' - meaning baby spider - is the wrong word. He emerges fully formed and sexually mature. You can tell him by the pair of bulbous mating organs at the front of his head.



Adult male leaving egg sac

Once out of the egg sac the male goes in search of an adult female of a previous generation - a giant by comparison. His equally pinhead-sized sisters, on the other hand, will not reach adult size and sexual maturity for some time. Thereby incest is avoided. I don't like to contemplate the little male's eventual fate, but it could be that his giant mate feels him as just a bit of a tickle. I would think that lacking the female's predation technique he will in any case be unable to eat. Just a pair of walking gonads, you might say. . .

Photos Densey Clyne

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Dreadful Difficulties with Customs – *Tony Morton*

I don't know if you've ever tried to send a collection of butterflies overseas? Well, my advice to you is: don't!

I'd been collecting these insects since I was 8 (except for a decade or two when I wasted the summers playing cricket). By 2012, I had amassed a collection of some 8,000 specimens from every continent except South America. The mounted butterflies were contained in 50 storeboxes and two 20 drawer cabinets. There were

also a thousand or so specimens in paper envelopes in tin boxes. Some dated back to 1943, caught by me in our garden in Delhi.

I'd been losing interest in the collection for a few years. I hardly ever looked at them; no one else seemed interested; my eyes weren't what they were ('No, they used to be my ears.' said Eccles!), and I was no longer driven to be out in the bush - to look for new sites for the 'Eltham', or 'Castlemaine' Copper, for instance.

I had seen plenty of splendid collections of insects reduced to dust by not being looked after properly, so I decided to donate my collection to a museum. This was not easy! The National Museum in Canberra (ANIC) complimented me on the photos I sent it but said it had no more room, having just received two large collections of Australian butterflies and expecting three others when their owners dropped off the hooks. The State Museums would accept the butterflies of their own state - if I took them there - but were not interested in anything else. I did not want to split the collection up.

I contacted the Hope Collection in Oxford, the British Museum of Natural History, the Zoological Museum in Munich, the McGuire Institute of Biodiversity in Florida. The first three expressed polite interest while the McGuire Institute said it would send out a curator to pack up my collection and arrange to fly it out to Atlanta to join the other eight million specimens in its vast collections. So, of course, I said 'Yes, please!'

It was now September 2013. On his way to Borneo to study a family of moths there, a nice young man spent a couple of days with us packing everything up into eleven big cardboard boxes. 'Easy compared to my last job – 140,000 beetles from Vienna.' he remarked.

In the meantime I had been struggling with permits (essential as the collection was going overseas). If you're still with me, I should explain that two sorts of permit were needed. One was for the 150 or so CITES (Convention on International Trade in Endangered Species) specimens I had ('dealers' can sell these for up to $1,000 each for the rare ones!), and the other to export Australian native insects. So I had been counting up the specimens I had of the various taxa, filling in the forms and paying the fees.

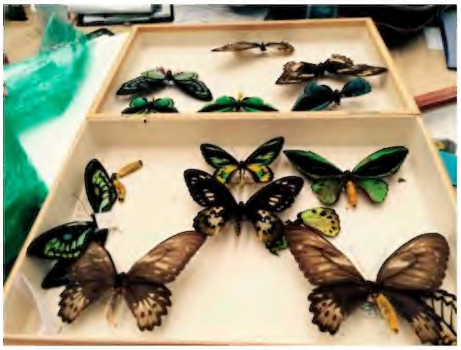
Eventually the precious permits arrived, a van came from the shippers and permits and boxes were carted off. I was very pleased and thankful.

It was now well into 2014. We were looking forward to a visit to Florida to see the collection *in situ* in the fullness of time. Instead I received an e-mail from the Institute saying that, as Australian Customs had failed to initial the permits in the space that allowed the exportation of the consignment, the butterflies were illegal and would have to be returned to Australia!

Heroic efforts on the part of the Director of the Institute resulted in a compromise after a few months: the Australian specimens would be admitted with the rest of the

collection, but the CITES specimens would have to be returned. A very irritated (I imagine) curator had to drive the five hours from Gainesville to Atlanta, unpack the eleven boxes, take out the CITES insects, repack the boxes and drive back. Demurrage (I've never used this word before!) was in the region of $10,000, which the Institute had to pay, I was told. So the vast majority of the collection was finally delivered to the Institute. It is now 2015!

So what happened to the 150 Rajah Brooke's Birdwings, and the Kaiser-i-Hinds, the *Troides* and the Apollos, I hear you ask? Well, they arrived back in Tullamarine and were immediately 'seized' by Australian Customs, the very people who had caused the whole problem, as 'illegal imports', there being no export licence from the US for them! Some months passed as I tried to obtain their 'release' through e-mailing WTA (Wildlife Trade Assessments) in Canberra, from whom I had obtained the permits.



During all this time the insects were without any protection (like naphthalene) and so were at the mercy of 'museum beetles' and booklice. Eventually I received the formal letter allowing me to collect them from Tullamarine Customs House and bring them back home. Many were much damaged through neglect and being shifted about during their travels. Those I was not able to glue together again are now in a bag awaiting artistic inspiration by the Frau. The few left that were in good condition I took down to the Melbourne Museum a few weeks ago which was pleased to have them as they're very pretty!

I don't know if this tale has a moral except to warn one not to tangle with bureaucracy if one can possibly avoid it!

Photos Tony Morton

Life history notes on the Dingy Bush-brown, *Mycalesis perseus perseus* (Fabricius, 18775) Lepidoptera: Nymphalidae –

Wesley Jenkinson

The Dingy Bush-brown is encountered regularly throughout much of Cape York Peninsula, the northern tablelands, sub-coastal and coastal areas with confirmed records south to the Dawson Bioregion (K. L. Dunn pers comm). There is one other record further south in the McPherson Bioregion listed in Braby 2000. Additional survey work in this region is required to determine the southern range limit. It has also been recorded in the Northern Territory.

In Queensland, this species is encountered in a range of habitats where tall grasses are growing including savannah woodland, eucalypt open woodland, paperbark swamps and occasionally rainforest margins. The adults have a preference for more open habitat and avoid closed rainforest.

Typically the adults fly throughout tall grasses usually within one or two metres of the ground. They settle frequently, with their wings closed, on grasses and also settle on the ground. They are not strong fliers but can fly quite rapidly if they have been disturbed. I have not observed the feeding habits of this species, but they are reported to feed on rotting fruit and rarely flowers (Braby 2000).

Whilst in flight, the adults could be confused with the Dusky Knight (*Ypthima arctous*) which is smaller in size, with the largest females having a wingspan of 33mm. This latter species has a more pronounced single, black, double-pupiled eyespot, enclosed by a thin brownish-orange ring, on both sides of the forewing and a smaller, single-pupiled one on the hindwing. However, *M. perseus* has a single small ocellus on the forewing upperside and a series of ocelli on the underside of both wings. There are two other similar species in the genus, these being the Orange Bush-brown (*M. terminus terminus*) and the Cedar Bush-brown (*M. sirius sirius*). These two species can be separated by the colour differences as indicated by their common names.

The sexes are quite similar in appearance. The males have a tuft of off-white hairs towards the base of the upperside of the hindwing along vein Sc+R1. There is also a greyish sex brand on the upperside of the hindwing near the costa with corresponding patch near the dorsum on the underside of the forewing. In comparison to the males, the females also are slightly larger and have a shorter, wider abdomen. There is a wet season and a dry season form of this species.

The average size of the specimens pictured are wet season form males 34mm, females 36mm and dry season form males 35mm and females 40mm. The dry season form adults are generally larger in size.

***Mycalesis perseus perseus* (Dingy Bush-brown) Wet season form**
Images top left to right: male, female
Images above left to right: male underside, female underside

***Mycalesis perseus perseus* (Dingy Bush-brown) Dry season form**
Images top left to right: male, female
Images above left to right: male underside, female underside

A female was collected at Byfield in Central Coastal Queensland on 21st July 2010 and was kept in captivity with a host grass. Several days later she laid a few eggs and was then released. These eggs were kept for life history studies. Subsequently two larvae were successfully raised in captivity on native Kangaroo Grass (*Themeda triandra*), a known host for this species.

The eggs were pale green, smooth, off-spherical, approximately 1.0mm wide by 0.9mm high.

Freshly laid egg

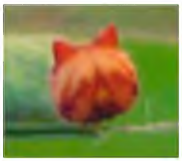
The first instars consumed most of their eggshells shortly after emergence. The very sluggish larvae were observed resting on either side of the leaves of the utilised host plant where they were only occasionally observed feeding along the leaf edge during daylight hours. They chiefly feed during the night (Braby 2000). The larvae raised completed five instars and attained a length of 30mm.

1st instar larva

2nd instar larva

3rd instar larva

4th instar larva



4th instar larva head

5th instar larva

Pre-pupa

Both pupae, measuring 13mm in length, were located below a stem of the host plant. They were attached with silk, hanging by the cremaster with the head suspended downwards.

Of the two adults raised, the earliest period from egg to adult was over 2.5 months, with egg duration 9 days, larval duration 57 days and pupal duration 13 days. The second adult emerged 13 days later. Both specimens were females.

Pupa lateral view

Pupa ventral view

There are adult records for all months of the year shown in Braby 2000.

Acknowledgements: I would like to thank John Moss again for commenting on the manuscript and Kelvyn Dunn for comments on southern distribution records.

Photos Wesley Jenkinson

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Braby, M.F., 2000. *Butterflies of Australia – Their Identification, Biology and Distribution.* vol 2. CSIRO Publishing, Melbourne.

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RAINFOREST GARDENS - Continuing Graham McDonald's 5 part series of "Gardening for Butterflies" which was originally published beginning with issue #17.

PART 4 - DRY SCLEROPHYLL GARDENS

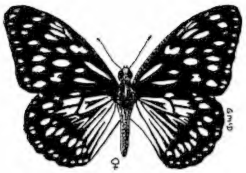
The majority of homes in the south-east corner of Queensland would be built on, or close to, previous dry sclerophyll forest, i.e. a fire-prone plant community dominated by a canopy of various *Eucalyptus* and *Corymbia* species with a sub-canopy of *Allocasuarina* and *Acacia* species. The ground layer may have been composed of native grasses such as *Themeda* and *Entolasia* with *Lomandra* and *Dianella* species. Some areas may have contained a shrub layer of *Pultenaea*, *Hovea*, *Dodonaea* and *Daviesia* species.

These areas are subject to the mindless 'selective' clearing of developers who clear out all the understorey and leave stark tall 'gum' trees which ultimately become weakened and dangerous. A point to understand here is that most of the butterfly host plants are in the understorey. Tall trees are for the odd mistletoe and perching crows. This is where the butterfly and native plant enthusiast comes to the rescue.

The soil type varies from heavy clay soils to sandy soils with all loam types in between, so select plants which are suited to those soils. Most will grow on clay if the structure of the soil is crumbly (enhanced by mulching) or if the plant beds are built up. Soil pH is usually acid (4.5 to 5.5 is normal for these soils) so the addition of small quantities of lime raises the pH to accommodate a wider range of plants (500g lime per square metre raises the pH by 1 unit).

The nature of the dry sclerophyll forest depends on fire - its intensity and frequency will govern the overall structure and species composition of the forest. Consequently, most plants will regenerate after fire, using a number of mechanisms.

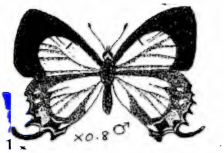
(a) Plants growing from underground rootstocks, tubers, bulbs, ligno-tubers and rhizomes.
These plants regenerate quickly after fire and take on a refreshed look for a time. They are ideal for butterfly gardens because they are long-lived and generally small or compact. These species include:
Aristolochia meridionalis – Clearwing Swallowtail
Chrysocephalum apiculatum (Yellow Buttons) – Australian Painted Lady
Cullen tenax (Emu Foot) – Chequered Swallowtail
Cycas spp. – Cycad Blue
Cymbopogon refractus (Barb Wire Grass) – some Grassdarts
Dianella spp. (Flax Lily) – some Skippers
Dioscorea transversa (Native Yam) – Pied Flat
Gahnia spp. (Sedge) – Swordgrass Brown
Glycine spp. (Glycine vines) – Common Grass Blue
Imperata cylindrica (Blady Grass) – Evening Brown, Greenish Darter
Lepidozamia spp. – Cycad Blue
Lomandra filiformis (Narrow-leaf Matrush) – Various Skippers
Lomandra longifolia (Long-leaf Matrush) – Various Skippers
Macrozamia spp. – Cycad Blue
Marsdenia spp. – Blue Tiger, Common Crow
Melastoma malabathrica – Coral Jewel
Oxalis corniculata (Yellow Wood Sorrell) – Chequered Copper
Patersonia spp. – Eastern Iris Skipper
Plumbago zeylanica (Native Plumbago) – Zebra Blue
Pseuderanthemum variabile (Love Flower) – Leafwing, Common Eggfly, Blue Banded Eggfly, Blue Argus, Danaid Eggfly
Secamone elliptica – Blue Tiger, Common Crow
Themeda triandra (Kangaroo Grass) – several browns
Viola betonicifolia (Arrowhead Violet) – Australian Fritillary


Blue Tiger – host *Secamone elliptica*

Zebra Blue – host *Plumbago zeylanica*

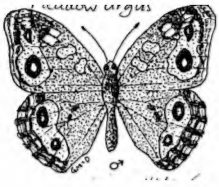
(b) Plants regenerating from dormant seed held in woody seed follicles which open after fire and germinate after rain in the ash bed, e.g. *Hakea, Banksia*. Very few of this group are butterfly host plants, although their flowers are often rich in nectar. Some such as *Allocasuarina* species are mistletoe hosts which are hosts to Jezebels and various 'blues'.

(c) Plants regenerating from hard dormant seeds lying in the soil and with seed coats cracked by fire. Most are short lived


Common Imperial Blue – host *Acacia* spp.

perennials or annuals, but are very pretty plants, e.g. *Acacias, Pultenaeas, Hoveas*. They are generally high maintenance plants and are fast-growing. They tend to need regular light pruning to keep them 'tidy' and may require fairly frequent replacing in the garden situation.
Acacia spp. (Wattles)-Tailed Emperor & var. blues
Aotus spp. – Fringed Heath-blue
Canavalia rosea –Purple Cerulean
Daviesia spp. (Pea Bushes) – Fringed Heath-blue
Dodonaea triquetra (Forest Hop Bush)-Fiery Jewel
Indigofera spp. – Jewelled Grass-blue, Tailed Pea-blue, Common Grass Blue, Common [=Large] Grass Yellow

(d) Annuals or short-lived perennials with abundant seed which germinates readily even without fire. May be allowed to seed freely around the garden and hand pull where not required.
Alternanthera denticulata (Lesser Joyweed) – Varied Eggfly
Bracteantha bracteata (Paper Daisy) – Australian Painted Lady
Brunoniella australis (Blue Trumpet) –Blue Argus, Varied Eggfly
Chrysocephalum apiculatum (Yellow Buttons) – Painted Lady
Crotalaria spp.(Rattlepod Peas) – Pale and Long-Tailed Pea Blues
Portulaca oleracea (Pigweed) – Meadow Argus, Danaid Eggfly
Scaevola aemula (Fan Flower) – Meadow Argus



Meadow Argus – host *Scaevola*

In conclusion, dry sclerophyll plants grow best in an undisturbed area. If you are starting from scratch, plant local Eucalypts and Casuarinas first (about 5 - 10 metres apart) and then in later years a selection of the smaller species mentioned in this article. Try to achieve that natural look! Little fertiliser or water is required with these plants and only light leaf litter is needed as a mulch. Some light pruning of the pea bushes and clumping grasses thickens them up.

If you already have large trees with mown grass, gradually allow native grasses and rushes to grow back and selectively remove exotic weeds. Enhance the understorey with additional plantings of shrubs and small Acacias.

New Distribution Records for Thecline Butterflies (Lepidoptera: Lycaenidae) in Australia.Part II. – *Lucia* and *Ogyris* – *Kelvyn L. Dunn*

Summary
This sequential paper (Part II) lists the remainder of the new spatial records for the subfamily Theclinae encountered during fieldwork over the last decade or so. It discusses the emergence behaviour of *Ogyris* in the field, witnessed at one of the locations listed as new. It also compares the observed behaviour and timing of wing expansion with reports in the literature and with unpublished rearing trials.

Introduction & Methodology
These sections, as provided in Part 1 (see Dunn 2016), apply to this paper too.

Results
Table 2 lists six species from eight new locations (arranged from north to south) across Australia; all sites fall outside (or if not, then very close to) the boundaries defined or inferred by Braby (2000) for the species concerned and so are new on that criterion. Those records considered worthy of individual comment due to their interesting circumstances, whether they be biological, behavioural or circumstantial, include a superscript indicating a note is available. These notes reference encounters by other workers in the last decade or so, where their published new locations fall close to those listed in this report. They may include one or more historic references where deemed informative.

Table 2: Additional new locations for species of Theclinae from beyond their known ranges in Australia

Species/Location	State	Geocode	Date	Format
Lucia limbaria				
53 km E by S of Balranald via Sturt Hwy (100m E of Hells' Gate pastoral station entrance)	NSW	34°41'S, 144°03'E	23 Sep 2012	Voucher
27 km ESE of Balranald (at the 105 km road marker on Sturt Highway)	NSW	34°44'S, 143°47'E	23 Sep 2012	Voucher
Ogyris barnardi				
22.7km SW of Narromine	NSW	32°22'S, 148°05'E	18 Apr 2015	Voucher
17.9km SW of Narromine	NSW	32°21'S, 148°07'E	18 Apr 2015	Voucher
Ogyris abrota				
Lady Falls (walking track), Mount Buffalo N.P	Vic	36°43'S, 146°50'E	17 Feb 2015	Obs-c2. Note 7
Ogyris amaryllis				
1 km W of Gracemere	Qld	23°26'S, 150°26'E	01 Jan 2002	Voucher Note 8, Fig 13

Ogyris ?ianthis				
Jenolan Caves, on ridge above Charlotta Arch	NSW	33°49'S, 150°01'E	08 Dec 2013	Obs-c3. **Note 9**
Ogyris zosine				
8 km NW by N of Quamby (Hotel), on hilltop (NNW of Cloncurry)	Qld	20°19'S, 140°15'E	16 Oct 2012	Voucher **Note 10**

Cautionary note: Category 3 records reported from any areas beyond accepted distributions need thoughtful consideration, balanced with a measure of healthy scepticism. Although some may be noteworthy, and can jointly serve as a directive for others to investigate (and potentially confirm), their inclusion on species maps or their unrestrained accumulation in databases (especially open-entry online versions) may distort the baseline evidence across time. Obviously, the retention of specimens is desirable for many of the Hesperiidae and Lycaenidae. These can supplement any photographs of species where insufficient wing characters were displayed (see Dunn 1994 p.72, Franklin *et al*. 2005 p. 2, Dunn & Franklin 2010 p.90, Dunn & Field 2012 p.27, Dunn 2015a,b). That said, I reiterate that: "*The traditional method remains the ideal and easiest sampling process, and it was the means used to obtain many of the new records listed in this paper (and others in this series), but its applicability is dwindling in light of ever-increasing reservation and legislation*" (Dunn 2015b p.27). In this case, the purpose of the Category 3 record (in the inventory above) is to encourage further investigation and as a stand-alone encounter, remains weak evidence of species' presence.

Key to Table 2 (Supplement):

Note 7. Several males of *Ogyris* were seen patrolling in the canopy, about the outermost branches of two adjacent eucalypts, in tall open forest. The adults, which were highly localised, were frequently interacting territorially with each other between 13:00 and 13:20 hours (AEDT), at an elevation of some 480-490 m a.s.l. A careful inspection of the general area using binoculars revealed several clumps of moss-laden *Muellerina eucalyptoides* (Loranthaceae) on boughs in the upper canopy of the host eucalypts. The mistletoes' root systems, which utilise epicortical runners in this genus, were visible and enabled a certain diagnosis to genus, and the pendulous growth form and foliage matched the species concerned. The adult butterflies, which showed flight behaviour typical of *O. abrota*, were visible from the Lady Falls walking trail (at 36°42'59"S, 146°50'24"E) for about five minutes. I had hoped to see a female inspecting the mistletoes, and so enable the identification of the butterfly with certainty – given its prominent yellow patch on the forewing – but none presented during that time. The location

was a gully, and the patrol area was small, atypical of that selected by the common *O. olane,* which maintains a lengthier flight routine across the taller trees in the canopy, and usually seeks out hilltops or ridges for that purpose, rather than favouring a more localised flight space associated with outer branches near host plants. I believe the adults were almost certainly *O. abrota* based on their patrol-behaviour and the circumstantial presence of creeping mistletoes within some 10 metres of where the males had established a lek. The species was not recorded from Mount Buffalo National Park during surveys by Dunn and Hunting (1983) nor by Crosby (1998), and its presence there, considerably east of the population at Tocumwal Regional Park (Braby 2005) – the northernmost location in Victoria – represents a northern boundary record in this part of its range in eastern Victoria. I would encourage butterfly observers to watch for females when visiting the park, to verify this tentative male-based identification.

Note 8. Several mature, slate-coloured larvae (Fig. 13) and pupae of *O. amaryllis* (along with two other *Ogyris* species) were present in ant-galleries at the base of a small eucalypt; the tree supported a large pendulous clump of *Amyema bifurcata* (Loranthaceae) (personal identification) on a branch some three metres above ground (Fig. 14). A newly emerged female *O. oroetes* ascended from an ant-gallery at 09:30h (AEST) – conveniently within moments of my arrival – and her presence drew attention to the mixed juvenile cohort hidden in the soil just below ground. She walked up the trunk about 50 to 100 cm before resting (aligning vertically, with head upwards), and soon expanded her wings (Figs. 15 & 16), a task achieved in a few minutes. She then continued to walk higher to rest again whilst her wings slowly hardened. The ant gallery and associated debris (dried leaves, twigs and fragments of fallen bark) also secreted four juveniles of *O. oroetes*, comprising a tan-coloured mature larva, a similarly coloured pre-pupa (Fig 13), and two pupae. A newly emerged female of *O. amaryllis* ascended very soon after the *O. oroetes* female. She likewise walked up the trunk, but for a longer distance, and then rested on bark to begin expanding her wings (achieved whilst adopting the same vertically aligned and anterior-upward stance as the *O. oroetes* female had opted for). When nearly expanded she walked higher to the fork some 120 to 150 centimetres above ground (visible in Fig 14), but like the *O. oroetes* did not depart, possibly on account of the strong northerly wind then blowing. Juveniles of both *O. oroetes* and *O. amaryllis* were resting gregariously in the galleries, secreted amongst the surface debris and soil to a depth of a centimetre or two. A careful and deeper inspection of the ant galleries (excavating soil for another two or three centimetres adjacent to the trunk) revealed several larvae of *O. zosine*, variably aged from first instar to mature (Fig. 17), which were huddled separately from the other two species (albeit still in very close proximity).

The ant *Iridomyrmex* ?*septentrionalis* (det. Allan Andersen) attended the juvenile stages of all three cohabitating *Ogyris* species at the base of this tree. A single male of *O. zosine* was patrolling in the canopy during the visit, sometime between 09:30-10:20 hours (AEST), but no other adults of *Ogyris* species were on the wing. A few *O. amaryllis* reared in captivity emerged between 07:30-08:30 hours (AEST) (later that month), but the emergence times for the other two *Ogyris* species were, in most cases, not determined as they were found already expanded on those occasions that the breeding box (left open with a covering of netting) was inspected during the field trip. Nonetheless, one male of *O. zosine* emerged at 09:20 hours (AEST) – taking about three minutes to expand his wings (time recorded in field notes) – and a female emerged during "the afternoon" (as she was still a pupa when inspected about midday). It is known that larvae of *O. zosine* (and *O. genoveva*) usually emerge between 07:30-09:30h (AEST) (Eastwood 1997). All adult females of *O. zosine* that emerged from pupae from this site were of the purple form.

This record for *O. amaryllis*, albeit a very widespread and locally common species, is of importance because the adults belonged to the inland subspecies *meridionalis* rather than *hewitsoni*. The latter subspecies occurs commonly nearer the coast in the Yeppoon area, east of Rockhampton, from where it is well known (e.g. Turner 1925, Manskie & Manskie 1972, Schmidt & Hughes 2006). This new location for the inland form, which is a considerable distance from the nearest record at this latitude, that being Emerald (Waterhouse & Lyell 1914) provides the easternmost record of *meridionalis* in central Queensland. It leaves a narrow gap between the ranges of the two subspecies in this region. Incidentally, on the opposite side of the road, within fifty metres of the mixed larval colony, a small cohort of mature larvae (Fig. 18) and pupae of *O. zosine* occupied ant-galleries at the base of a tree supporting a clump of a *Dendrophthoe* species (Loranthaceae). The mistletoe, which was then flowering, was almost certainly *D. glabresens* (personal identification), and the video image taken showed that it supported a smaller hyper-parasitic mistletoe (but which was not the larval food plant). These juveniles were attended by the ant '*Camponotus* sp. A' in the *novaehollandiae* group) (det. Allan Andersen) (Figs 19 & 20) and were not accompanied by juveniles of the other two *Ogyris* species. Within the ant-galleries, the *O. zosine* pupae were attached to leaf litter or were secured to the trunk base, all just below ground level.

On a subsequent visit, some 10 years later, I could no longer recognise the area. The open grassy woodland that once fringed the western side of the township is now, for the most part, residential or industrial zones. There are some eucalypts retained in parkland reserves, now amidst mown lawn grass, but this modified habitat may not be suitable for colonisation of the

appropriate ant species should mistletoes infest these remaining trees across time. The site, which the label data indicates was '1 km west' was likely WSW via the old highway, or even SW along another road, rather than due 'west' (which was based on a supposition that I was heading inland and therefore broadly in a westerly direction). Moreover, the distance of '1 km' (a rounded off odometer reading) would imply somewhere between 0.6 to 1.4 km by road from the Post Office. After an hour's inspection, at suitable distances along various roads from the PO, I reluctantly accepted that the two colonies had likely been lost to changes in land usage since 2001. Hence, there was no opportunity for follow-up observations on the longitudinal occupancy of these two trees had they remained undisturbed.

Note 9. A solitary *Ogyris* adult was seen flying down a woodland ridge, some ten metres above ground, sometime between 15:15 and 15:35 hours (AEDT) (the duration of observations near the arch). It was in silhouette as it flew overhead for several seconds and then down towards the Charlotta Arch. As it approached a metre above eye level, its upper side pattern was visible during one or more forewing downbeats, before the adult vanished from sight after flying down through the arch. It appeared to have a small yellow area on the forewing, but with the wing angles apparently eclipsing the hindwing patterns, leaving them darkened and unseen. The yellow markings were not prominent, and so did not match with the female of *O. abrota*, which eliminated that species. It similarly did not match with the female of *O. genoveva* and it was too small for that species. Another possible candidate, *Vanessa itea*, with its prominent yellowish patch on the forewing, is common in the broader area (and can occasionally fly high up amongst *Ogyris*) but the butterfly observed was a thecline, not a nymphaline. The adult's size and yellow colouring, which was invisible from below, instead suggested a female of *O. ianthis*. This rare species is unknown from the Blue Mountains, and so raises a measure of doubt concerning this identification, given the extent of survey for over a century or more in this region. I call on other enthusiasts visiting the Jenolan Caves and regional sites in the western Blue Mountains to seek out this species as the opportunity avails in case it occurs there, which it may.

Note 10. A male *O. zosine* was taken, and a female (blue form) sighted, on the summit between 13:50 to 14:50 hours (AEST); this represents the northernmost record of the butterfly in western Qld, albeit a minor extension. There were four other butterfly species on, or near, the summit namely *Papilio demoleus*, *Acraea andromacha*, *Theclinesthes miskini* and a second *Ogyris* species. The last mentioned encounter may have been a wandering *O. amaryllis* or, perhaps, a stray *O. barnardi*, or even *O. olane* (if that last mentioned species occurs in the Gulf region). Unlike the *O. zosine* male, which I netted after three sweeps in quick succession, the smaller *Ogyris* did

not linger or patrol the summit. Its upper side colouring was not visible – an event which is commonplace with these higher-flying species – and no others of its kind arrived at the summit during the hour survey. Only five species of butterfly at a prominent landform suggests butterfly paucity in that region at that time. (The main reason for ascending this particular landform was to look for adults of *Acrodipsas*, and although I saw none on any hills visited, there may be populations of some northern species yet to be found in the Gulf Country.)

Discussion

Each new record adds insight into the distribution of those species of butterfly listed and each helps fill knowledge gaps evident in their distributions, as based on the range-fill maps by Braby (2000). Those of *L. limbaria* are cusp records that define the northern boundary where reports are sparse or in absence, due to a dearth of survey on the Hay Plains. The records of *O. barnardi* from SW of Narromine define the southwestern boundary in NSW. However, the habitat in this area extends a little farther inland and so more sites for the butterfly would be expected in that southernmost region. The chance encounter of consecutive emergences of females of *O. amaryllis* and *O. oroetes* from the ant galleries is a rarely seen event in the wild. It deserves further discussion because of the insight into the biology of this genus it provides.

The field observation of emerging *Ogyris* (Figs 15-16) supports the widely held understanding that adults of *O. amaryllis*, *O. oroetes* (and presumably *O. zosine*) do not expand their wings whilst still in the ant galleries. Nonetheless, there is a unique account for *O. genoveva* by Eastwood (1997) reporting that expansion can occur in the galleries. Conflicting with this, Moss and Kendall (2016: 57) clarified for *Ogyris genoveva* and *O. zosine*, that "*The final instar larvae pupate in the ant nests* [meaning galleries, as ant juveniles are not present] *where adults finally emerge, make their way out, inflate and dry their wings until ready to fly.*" Their report, which may have been based on actual witnessed events in the field, or may be interpolative observations from captive reared material, supports the field observations for *Ogyris oroetes* and *O. amaryllis* provided in this paper. These reports similarly align with historic observations by Borch (1926), concerning *Hypochrysops apollo* – a thecline species that pupates in ant-occupied galleries inside an epiphytic plant. Borch (1926: 214) reported that, the newly eclosed adult is apparently attracted to light, and that wing expansion does not occur "until the insects are out in the open".

On that evidence, the intriguing report by Eastwood (1997) needs exploratory commentary and an explanation of the circumstances – the cinematographic processes, which I witnessed in part. Firstly, it makes no evolutionary sense for the newly eclosed adults to expand underground; their wings cannot expand fully (from a mechanical perspective) when confined in small tunnels, and those unfortunate adults that opt for such a strategy would be selected against on probability. They would be

unable to fly with inadequately expanded wings (once hardened in that crippled state) and their fate would almost certainly be predation, without mating. Secondly, it would appear, based on several breeding trials I carried out during the 1980s with South Australian stock of *O. genoveva*, that exposure to low lighting stimulates wing expansion at the appropriate time (post emergence), and this presumably almost certainly applies to other species of *Ogyri*s that pupate in galleries. Timely exposure would normally occur after the adult emerges from the darkened gallery (into daylight) or approaches the opening (receiving variably shaded light at that time). The adult ascends the trunk or other upright object, to a suitable distance where there will be space to expand and dry its wings; it rests with its head directed upwards and optimises gravity to assist that process. In 1982, I placed about a dozen pupae of *O. genoveva* (with their attachment substrates) in lightproof plastic containers, and a similar sized cohort of pupae in identical containers but with the lids of the container left open a centimetre (albeit a difference which may have influenced humidity). The opened section (one centimetre wide) allowed an area of shaded light to enter (that being unlit room light during the day), which newly emerged adults could seek out, should they need to, and so more closely simulated the underground tunnel-entrance lighting circumstances in the wild. In most cases, the newly emerged adults kept in darkness failed to expand their wings. Several adults expanded only partially with the exception of a single male, which expanded fully. In contrast, in the trial where light was available at the open section, all adults expanded their wings fully. Although the sample was small, it seemed that there could be a brief window of opportunity for exposure to light immediately or very soon after emergence (perhaps within five to ten minutes based on circumstantial observations), after which time, if light is not detected, the wings would not expand fully and could neither function for flight nor uplift. When light-proof boxes were occasionally opened to check for emerged adults (which occurred periodically once coloration was evident on the wing cases), this would have provided light briefly, and perhaps, had one or more adults recently emerged that exposure may have resulted in the partial expansions seen in some cases. Further experiments with larger samples, and a rigorous design (enabling inspections using infrared without introduction of light, such as in a photographic laboratory), are required to strengthen these tentative findings.

The report by Eastwood (1997) for this same species would seem to be a mistaken interpretation of the events filmed by the BBC crew during their visit to the butterfly colony at Eatonsville, NSW, in 1993 (where I assisted as a scientific advisor, in company with Rod Eastwood). Eastwood (1997) wrote later, "*The imago moves slowly after emerging from the pupa and expands its wings inside the gallery*" (p.141). One hypothesis for this evidence captured on film might be that this incident was simply a rare event, one where one or more individuals may have inherited a fault in their timing mechanism for wing expansion, but there is a more likely explanation. The crew's use of fibre-optic lighting, shone into the galleries to enable filming underground, was likely causative. This cinematographic factor during the emergence,

which Eastwood (1997) left unmentioned, is an important interference linked to filming, one that could modify insect behaviour at a critical time during the switch from previously nocturnal to thereafter, diurnal activity. If light reception is the triggering mechanism, the introduction of fibre-optic lighting into the galleries signalled an inappropriate time for wing expansion, a changed circumstance for which its evolutionary adaptations offered no safety net. In the past, collectors of *Ogyris* sometimes observed, but rarely reported on, the occasional failure of reared adults to expand their wings when emergence occurred in the field, often inconveniently during days of transit. On one occasion, this response was attributed to prolonged vibration (Quick 1974), and on another, it was suspected to be a result of minor dehydration from 'dryness' (associated with heat stress during carriage in the vehicle) (J. Le Souef p.c. 1979). Quick's anecdote is worthy of reiteration, as it also sets the scene of fieldwork, and livestock handling difficulties experienced:

> "*Unavoidably, I had to carry them* [pupae of *O. oroetes*] *in the car with me for another 1600 km before I reached my destination, and then for the 3600 km return trip. Just prior to the commencement of my return, the first pupa was showing signs of impending emergence. Some apprehension regarding the effect of vehicle vibration was unfortunately well founded, and although identifiable, the insect failed to expand its wings fully*" (Quick 1974: 51).

During lengthy interstate trips, particularly whilst on route to the next destination, collectors (in my observation) normally store *Ogyris* pupae (along with diurnal species) in darkness or near darkness to prevent any emerging adults from flying and battering themselves before time can be set aside to inspect and attend to them. I suspect, in the cases of these two particular collectors', that their newly emerged *Ogyris* did not receive adequate light to signal wing expansion, or received insufficient light (as chance would have it) resulting in partial expansions (but enabling identification as reported) and the insect's wings subsequently hardened in that incomplete state. My quasi-experimental trials in 1982 with material from Eagle on the Hill (about 2 km W by N of Mount Lofty, but labelled Mt Lofty), strengthened my belief and, in 1983, I modified my breeding technique to allow room light to penetrate the containers for this butterfly group (with no further issues that I can recall). Plastic kitchenware that was transparent or clear later replaced the older style non-translucent white or dark coloured plastic containers available in the 1970s, and these replacements proved ideal and resolved that issue. The trade-off, of course, is that adults left in light transmitting containers (or even translucent ones) may fly around once their wings have hardened and batter themselves if not promptly attended to, but it is difficult to eliminate all issues in the field by any single means.

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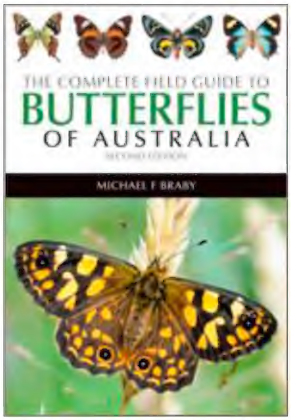
Fig. 13. Tan coloured pre-pupa of *O. oroetes* and two slate-grey larvae of *O. amaryllis* (showing variation in pattern contrast) after extraction from the *Iridomyrmex* ?*septentrionalis* ant galleries of the mixed *Ogyris* colony (ants removed).
Fig. 14. Habitat: Mistletoe host (*A. bifurcata*) which supported the mixed colony in rural-grassy open woodland on the western side of the township of Gracemere, Qld.
Fig. 15. *O. oroetes* female newly emerged after ascending the trunk and expanding her wings.
Fig. 16. Same female *O. oroetes*, which after expanding her wings, walked higher up the trunk preparing for departure flight.
Fig. 17. A tan coloured larva of *O. oroetes* (by then a pre-pupa), alongside a mature larva of *O. zosine* and a larva of *O. amaryllis* (immediately crawling beneath bark to hide in shade), all found together in the mixed colony (*Iridomyrmex* ants having been removed).
Fig. 18. Captive fed mature larvae of *O. zosine* taken from the *Camponotus* colony.

Fig. 19. *O. zosine* pupa attended by ants (*Camponotus* sp. A' in the *novaehollandiae* group); soldier in lower left corner, with worker on pupa.
Fig 20. *O. zosine* pupa (nearing emergence) attended by two workers ('*Camponotus* sp. A' in the *novaehollandiae* group).

Photos by Kelvyn Dunn.

Corrigenda (Part I)
'Part 1 – *Jalmenus, Hypochrysops, Hypolycaena* & *Rapala*' in **Issue No. 81, p.31**. During the magazine typesetting and layout, Figures 4 and 5 were interchanged and wrongly numbered. The adult shown as **Fig. 4** is *J. daemeli* (from SSW of Sarina, Qld) and the adult shown as **Fig. 5** is *J. ictinus* (from Ivanhoe, NSW). I had intended that the adult of *J. daemeli* precede the juvenile stages of its species.
An omitted reference from Part 1, namely 'Dunn 1998', has been included with the references for Part II.

BOOK REVIEWS



"The Complete Field Guide to Butterflies of Australia," Second Edition – Michael F. Braby. Published by CSIRO Publishing 2016. pp. 384. ISBN: 978 1 486 30100 3 (paperback version), $49.95. (e-book version also available) – Book Review by *Mark M. Hunting*

This second edition of Dr. Michael Braby's "*The Complete Field Guide to Butterflies of Australia*" (Field Guide) represents the continuum of currently published knowledge of the complete Australian butterfly fauna, as it builds upon the knowledge of earlier landmark publications on this subject, namely:

- Common IFB, Waterhouse DF (1981) "*Butterflies of Australia*" Angus & Robertson, Sydney.
- Braby MF (2000), "*Butterflies of Australia Their Identification Biology and Distribution*" CSIRO Publishing, Melbourne.

The timing of the second edition of the Field Guide has been driven by the significant escalation over the past twelve years, since publication of the first edition, of research papers and popular books dealing with the public and scientific interest in our invertebrate fauna, and also the need for inclusion of several additional butterfly species to the existing body of knowledge to 2014.

Dr. Michael Braby has taken the opportunity to include the addition of several refinements to the first edition, which now include (at least):

- A revision of the order of presentation of the species to adopt new developments in the classification of butterflies worldwide, combining morphological and molecular characters;
- A new chapter on "*Collecting and Preserving Butterflies*," which presents a systematic approach to setting up and maintaining a reference collection;
- An expanded section on established and vagrant fauna on the remote islands under Australian administration;
- Inclusion of the additional species to the tally – ten additional species to continental Australia and a further nine species from the outlying islands.

This book is a departure from the trend in recent years, with many popular publications focusing on photographs and artwork of live adults and their early stages of metamorphosis / life cycle. However, the superb photographic colour plates of specimens in their classically set positions with both recto and verso images are second-to-none for easy diagnosis to species and sub-species level. This level of detail is aptly targeted for use of this book in the field and in the studio. The plates are enhanced with detailed line drawings of the sex brands of male Coeliadinae and Hesperiinae (Family Hesperiidae), where separation of certain of these species would be otherwise difficult.

Other important user-friendly features of the Field Guide that have been particularly well thought-out include:

- The consistency of the format with the colour plates on the right hand page and the diagnostic / descriptive notes on the left. This, together with the colour-coded tabs, guides the user through the butterfly families, and makes it very easy to find whatever you are looking for in a predictable fashion throughout the book;

- The descriptive notes, which are supported with distribution maps and adult flight charts. These two features combine to greatly assist the field worker to expect the 'where and when' for each species and also to search in areas to extend their known distribution.
- The glossary of technical terms used in the book, and the use of both scientific and common names throughout, with a chapter dedicated to "*How to use this Book*."

Not only that, but the tests of a must-have book on this subject, are the extent of wear and tear (as first-stop-shop) and whether it fits in the car's glove box! The first edition of the Field Guide has been the clear winner on both counts, and I fully expect that this second edition will be similarly used and referred.

Finally, a few words about the author, who needs no introduction! Michael Braby graduated in 1987 with a B.Sc. in zoology from La Trobe University, and completed his PhD in entomology from James Cook University in 1995. This was followed by post-doctoral positions at Harvard and at the ANU before moving to the Northern Territory as an Invertebrate Conservation Biologist for butterfly systematics, evolution and ecology.

He has published more than 100 research papers on his passion for insect ecology. His primary reference work in 2000 was the 2 volume "*Butterflies of Australia Their Identification Biology and Distribution,*" which won the 2001 Whitley Medal for best book on the natural history of Australian animals. The 2004 first edition of this Field Guide won the 2005 Whitley Award for the best book in the category of Field Guide, then in 2012 he won the AES Ian Mackerras Medal for his contribution to lepidoptera taxonomy and ecology.

Dr Michael Braby is currently in Canberra as a Visiting Fellow at the ANU, and a Visiting Scientist to ANIC, and holds the position of Chief Editor of Austral Entomology.

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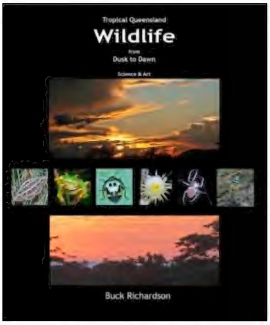

Tropical Queensland Wildlife from Dusk to Dawn - Science and Art. 348 pp, 250x300mm, hardbound, ISBN 9780957729018, publ. by LeapFrogOz Kuranda Kreations. Price $65 (incl. postage in Australia).

Available from http://www.leapfrogoz.com.au/LeapFrogOz/Tropical_Queensland_Wildlife_from_Dusk_to_Dawn_Science_and_Art.html

Ed. The following is not strictly a review of this book but rather a speech given by Geoff Monteith (Queensland Museum) at the book's launch at the Annual Conference of the Australian Entomological Society in Cairns on 28 September 2015.

Kuranda is a small town in the rainforest just a short drive up the Range Road west of Cairns. It a pretty and peaceful place, and over the years I have had cause to delve into its entomological history once or twice. I've discovered that beneath its placid surface there is obviously "something in the water" that drives grown men to the brink when it comes to Lepidoptera.

The original Butterfly Man of Kuranda, Frederick Parkhurst Dodd, photographed in his Kuranda garden in the 1930s. The inset shows how the Queensland Museum used this image in the logo for its first tour of the Dodd collection in 1991 (QM Photo).

Frederick Parkhurst DODD was a bored bank clerk with a wife and three children who got hooked on insects, quit the bank, and moved to Kuranda in 1905. He spent the rest of his life studying and displaying the amazing moths and butterflies he found there. He arranged 40 large cases of specimens in spectacular geometric designs and toured the nation with them in 1918 and again in 1923. Early tourists, between the wars, caught the train up from Cairns and paid sixpence to view the cases in his Kuranda home.

Dodd had a tough life, and one of the cases of moths tells a story. It's a verse from a Longfellow poem, spelled out in small brown moths set among the most exquisite specimens he could find. Longfellow wrote the poem about 1870 to commemorate the 50th birthday of Alexandre Agassiz, then professor of Zoology at Harvard University. (No one writes poems about professors of zoology any more!)

The famous case of Lepidoptera, spelling out a verse from Longfellow, which Frederick Dodd put together in Kuranda about 1916 as one of the show cases of his 1918 and 1923 Australian tours of his collection. The case is now in the Queensland Museum (QM photo).

The verse reads:

And whenever the way seemed long
Or his heart began to fail
SHE would sing a more wonderful song
Or tell a more marvellous tale

"SHE' in that verse is Mother Nature...earlier it reads: *"...and Nature, the old nurse, took the child upon her knee, saying here is the story thy Father has written for thee..."*.

So Dodd was saying that, whenever he was doing it tough, his beautiful Lepidoptera would always cheer him up and give him strength to carry on.

Dodd died in 1937. In 1953 a fruit grower named Ted Harris moved from Melbourne to Kuranda and cleared the rainforest to plant citrus at the site which is now the "Rainforest Station" tourist park. He got hooked on Lepidoptera and developed a gigantic collection of butterflies...but in 1971 his partner (Ted Alston) died and he fell into such depression that he gave his entire collection away to the Queensland Museum and lived another 8 years.....broke, alone and Lepidoptera-free.

In the mid 1980s a butterfly collector named Paul Wright, whose appearance recalled Errol Flynn and could only be described as dashing, arrived in Kuranda. He tasted those waters and went on to develop the largest walk-in butterfly house in the southern hemisphere. For the entomologists here who appreciate a good high-hygiene, mass caterpillar rearing facility, I recommend you take a look behind the scenes at the Kuranda Butterfly Sanctuary. It's a Kuranda icon and used to be Kuranda's largest employer.

In 1980, quietly, before construction of the butterfly house, another escapee from southern commerce had arrived in Kuranda, but it was 25 years before the waters claimed him. This was Buck Richardson, author of the magnificent book we are launching today. Buck had an engineering background and, with his partner Eve Stafford, they built a wonderful house in the rainforest and immersed themselves in the artistic life of the community. Early projects included fabric design and printing. As the years passed computer imaging and digital photography came of age, and this was a perfect fit with Buck's precise mathematical background (he calls it "mothematical"!) and his outrageous imagination. Around 2004 he discovered moths coming to his houselights as items not only of great beauty but also as elements of astonishing natural designs. He made contact with local entomologists like Max Moulds, Paul Zborowski and Ross Storey – and with ANIC moth-maestro Ted Edwards. He acquired (and learned!) scientific names for them, started a website of moth images and, in 2008, published an amazing little book called "Mothology". It comprised 400 species of classified Kuranda moths and scores of mind-bending art pieces using moth images. The local parliamentarian wrote an introduction titled "Forewing", not "Foreword'...did she know?

That book caused a meeting between Buck and a recent entomological refugee to Kuranda, ex-ANIC orthopterist, David Rentz. They became firm friends and now go light trapping 30-40 times a year. This has opened Buck's world to a plethora of other insect groups, especially shield bugs which have the symmetry and bold patterns which press Buck's creativity buttons, and has led to the present book, "Tropical Queensland Wildlife from Dusk to Dawn". It has 1500 species, fully named, interleaved with Buck's art pieces.

Buck admits to being influenced by Dutch artist M.C. Escher who made striking and beguiling images of interlocking patterns melding and transforming as the eye sweeps over them. The most familiar are of flocks of birds merging as they overlap, with the pattern completely filling available space. Escher was restricted to working on a flat surface, though he has a famous piece viewing his own reflected image in a silvered sphere. Similarly, Dodd could only arrange his specimens by painstakingly positioning the pins on the flat bottom of an insect case. Virtual 3-D computer imaging has released Buck from dependence on a flat surface and his interlocking moths and shield bugs seamlessly coat the surfaces of spheres, cones, cylinders and infinitely disappearing vortices in his artworks.

The book satisfies the taxonomist who wants to see wide coverage of reliably named species, it satisfies the lover of beauty who just enjoys the wonders of the insect world in close-up, and it satisfies the artist who wants to be surprised and entranced by inventive use of imagery drawn from nature. As I wrote to Buck when I first received a copy: "*It's the sort of book where one makes a cup of coffee then opens it in reverence in one's best lounge chair with the best light....and suddenly realises an hour later that it's past dinner time.*"

But a warning to Buck! If you drink too deeply of those magical Kuranda waters you may end up in the same situation described by Frederick Dodd in an unpublished manuscript written about 1917. Speaking of his life in Kuranda, he writes: *"Each year reveals other marvels, so, to such as myself, in the grip of that which some are pleased to call science, there can be no change, they are enslaved to the end..."*

Geoff (left) and Buck after the launch
Photo Eve Stafford

It gives me great pleasure to launch this wonderful and inventive book.

GBM
4Oct15

Macro photography workshop conducted by Erica Siegel – *Lois Hughes*

January 30th announced its arrival with the same energy-sapping heat and humidity of preceding days but … with a forecast of storms and rain, a promise of blessed relief after days of blistering heat, but not just yet, please …..

A smorgasbord of nectar and host plants invitingly beckoned, awaiting the arrival of feasting insects, but … would these elusive creatures be enticed?

An eager group of nine participants rolled in early, cameras at the ready, hoping to learn some of the secrets of macro photography and to put their skills into practice.

Erica displayed some enviable photos of insects she had skilfully captured, an excellence to aim for, and after detailed instructions, the search for subjects began.

The *Senna gaudichaudii* flowers were alive with Peacock, Great Carpenter, Blue Banded and Teddy Bear bees all vying furiously for the pollen laden, yellow flowers. Other interesting insects also enjoyed the banquet. With great patience and determination, the group spent considerable time seeking to capture these fast moving beautiful creatures.

"It's much harder than I thought", "Please stay still for a moment" were some of the overheard comments, along with "Oh, no, they're blurry", "I need more practice" and "Can I please come again, there's so much of interest here to photograph?"

The stationary beetles, caterpillars and stick insects just hangin' about, were much easier to practice on.

I hope you enjoy the gallery of photos which some of the participants submitted.

Many thanks to Erica for her patient dedication on such an uncomfortably hot morning, but the clouds rolled in …. Our morning tea and lunch breaks, the latter on the back verandah because of rain, gave us an ideal opportunity to share stories, good food, and enjoyable company. Thanks again to Erica, your time and shared skills were greatly appreciated by us all and some participants are asking if we can have another workshop.

Jim Evans

Linda Sulakatku

Linda Sulakatku

Kathy Clark

Cheri Desally

Cheri Desally

Kathy Clark

Rod Cox

In Focus - The 'Who' Behind the Lens – *Lois Hughes*

Since January 2014, the pages of our Metamorphosis magazine have been graced by stunning photos of various creatures, taken by a very talented and knowledgeable lady, Erica Siegel. I felt it appropriate at this time to acknowledge her contributions, not only to BOIC but also to the many other projects and publications for which she has shared her many photos, knowledge, and observations.
As the song goes "From little things, big things grow" and as Erica has willingly shared her time, knowledge and photos with us and others, demand for work has snowballed.

BOIC was first introduced to Erica in Issue 73, June 2014, after I encouraged her to document her observations and share whatever knowledge she had about native solitary bees. At that time there was scant published information available to the general public. Erica was reluctant at first, considering herself unqualified to do so. However, with very little knowledge myself but great enthusiasm and in consultation with Erica and Corinne Jordan, a highly qualified and knowledgeable bee keeper and also inspired by the stunning and informative photos Erica had taken in our garden, I wrote an introductory article "Getting a Buzz out of Bees".

This was a brief overview of the native solitary bees Erica and I had observed here at Mt. Cotton, S.E. Queensland. This was followed by a series of informative articles by Erica on each of the species I had mentioned in the overview.

Since then Erica has continued her search for identification, lifestyle and behavioural characteristics of the many other native bees she is photographing. Posting them on Facebook, the www.ozbird-wildlife.com website, and The British Isles Wildlife Forum, has greatly expanded her knowledge, as qualified experts have responded, sharing their knowledge and research freely with her. As a result, this wider exposure of her detailed photos has led to an increasing demand for her work in publications, exhibitions, displays and now for talks on native solitary bees.

The following is a list of publications with Erica's photos ….

Explore – Australian Museum magazine – Spring 2010
G Green – Living Made Easy magazine – June/July 2011 issue 32
Scientriffic – CSIRO magazine – March/April 2011 issue 72
Bush Heritage desk calendar 2011
The Bee Hotel ID Guide – University Western Sydney 2014
Wildlife Australia – issue Spring 2015, Winter 2015
Bees as Pollinators – Central Tablelands A3 poster CTLLS NSW Government – July 2015
Cavity Dwelling Bees – Central Tablelands A3 poster CTLLS NSW Government July 2015
Suburban Living magazine – issue July/Sept. 2015
Murrindindi Tourist Guide – issue summer 2015/16
The Australian Beekeeping Manual by Robert Owen – October 2015
The Native Bee Book by Tim Heard – December 2015

Land for Wildlife Newsletter Qld. – issue January 2016
Miniature Lives by Michelle Gleeson – March 2016
Metamorphosis Australia BOIC magazine – issues 73-77, 79, 81

Erica's aims are two-fold, to delight and inform. As a regular stall holder at local markets, her matted or framed photos and cards, depicting not only native bees but stunning bird and other wildlife images, attract attention. This gives her an opportunity to inspire others to be passionate about our environment and to facilitate changes in their backyards to provide safe and welcoming habitats for our wildlife as increasing development encroaches upon our bushland.

Erica, in her endeavours, fulfils many of the aims of our organization. We are privileged to have her as a participating BOIC member and congratulate her on her continuing success.

1. Resin bee (*Megachile*)
2. Masked bee (*Hyaleus honestus*)
3. Blue Banded bee (*Amegilia cingulata*)
4. Neon Cuckoo bee (*Thyreus nitidulus*)

Photos Erica Siegel

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Pooh Corner Wacol Excursion – 16th July, 2016 - *Paul Klicin* – Field Trip Co-ordinator

Thanks to everyone who attended. In total we had 12 enthusiastic attendees on the day. Rain threatened to dampen everybody's enthusiasm but fortunately the rain stayed away until our walk was all but complete.

Before setting out on our 3.9km walk, Club President Frank Jordan gave a brief history of the Pooh Corner bushland which was once a military training camp during World War II, and more recently in 2005 it was slated for private sale for Industrial Development. Now Brisbane City Council

owned and thankfully declared as 'public recreation and open space' we are now able to enjoy the vast array of flora and fauna that Pooh Corner has to offer.

Throughout our walk Frank (pictured) pointed out the various butterfly host plants that grow in the area and provided valuable insight into each butterfly host plant. Some of the host plants identified were; Karamat (*Hygrophila angustifolia*) - Chocolate and Blue Argus, Tiny Grass-blue and Varied Eggfly; Love Flower (*Pseuderanthemum variabile*) - Leafwing, Blue Argus and Varied Eggfly; Cressida Pipe-flower (*Aristolochia meridionalis*) - Clearwing Swallowtail; Spade Flower (*Hybanthus stellarioides*) - Glasswing); Soap Tree (*Alphitonia excelsa*) - Small Green-banded Blue; Creek Sandpaper Fig (*Ficus coronata*) - Co mmon Moonbeam; Monkey Rope Vine (*Parsonsia straminea*) - Common Crow. For further information the club has a Butterfly Host Plants book available for purchase.

Glasswing
Photo Esther Nageli

Despite the overcast weather we were able to spot a small Glasswing butterfly (*Acraea andromacha*) resting close to the ground with its local host plant the corky passion vine (*Passiflora suberosa*) in plentiful supply throughout the reserve.

Stock Photo Evening Brown

Another species of butterfly was flushed from the undergrowth as we continued along the walking track which was quickly identified as the Evening Brown (*Melanitis leda*), and due to its flighty nature and uncanny ability to quickly go to ground and blend into the undergrowth in avoiding predators, even our most avid photographers were unable to capture a photograph of this butterfly on the day.

Further along our walk we located several Box Mistletoes (*Amyema miquelii*) growing on young eucalypts which were able to be expertly identified by club member, mistletoe expert and co-author of the new book, 'Mistletoes of Subtropical Queensland, New South Wales and Victoria', Ross Kendall, who was thankfully in attendance on the day.

Scarlet Jezebel larva
Inset Photo - Scarlet Jezebel (*Delias argenthona*)
Photo John Moss (BOIC website)

Luckily the mistletoes were at eye level on these young eucalypt trees as we were also fortunate enough to find a sole final instar Scarlet Jezebel (*Delias argenthona*) caterpillar almost ready to pupate on one such tree.
A small Monarch (*Danaus plexippus*) caterpillar was also spotted clinging to a small exotic Wild Cotton plant.

Further along our journey we were thrilled to identify another young Box Mistletoe specimen which hosted an army (sic) of roughly a dozen Black Jezebel (*Delias nigrina*) caterpillars crowded together on several mistletoe leaves. Note the subtle difference between the Scarlet Jezebel larva and Black Jezebel larva, one being the distinctive yellow spots on the Black Jezebel larva if you look closely.

Black Jezebel larva

Despite the lack of butterfly activity on the day as is common during the cooler months of the year along with the overcast weather, everybody left feeling happy and invigorated after the walk. The numerous butterfly host plants identified, along with information provided on the day, I'm sure will prove invaluable in the future

especially for those wanting to grow host plants in their gardens to attract butterflies.

Various butterfly host plants are available through the club and also from some specialist plant nurseries.

Stay tuned for exciting news regarding upcoming field trips in the coming months and we hope to see you along at the next one. Meanwhile, happy bug hunting.

All photos, except where otherwise credited, Paul Klicin

IN THE GARDEN

Macleay's Spectre (*Extatosoma tiaratum tiaratum*) Spiny Stick insect – painting by Lois Hughes

We have a large Banksia Rose that sprawls over a trellis adjacent to our back verandah. It's a favourite resting place for small birds, a food source for hairy moth caterpillars as well as Spiny Stick insects, and many wasp species trawl its branches for prey. Periodically I tip stick insect eggs at its base. Recently we were delighted to discover a mature, large green female Spiny, fat with eggs, so well disguised she had remained unnoticed amongst the greenery. Spotting the Big Green Lady, as we affectionately named her, became our daily ritual for many months.

Glancing up from my drawing, I noticed a Kookaburra perched on the cross arm of the Wisteria-covered power pole, a favourite lookout, as they scan the paddock for prey. Imagine my dismay, when I next glanced up to see the bird bashing something large and green on the fence adjacent to the Banksia Rose! It was our Big Green Lady! There was nothing I could do to rescue her but as I watched, I had an ahh! moment.

It had always puzzled me how the wingless females had mysteriously arrived on our apple tree many years ago. Could it be, as I just witnessed, that an egg-laden female is taken by a bird, which perches in a tree and as it bashes the insect on a branch, eggs are flung onto the ground? Alternatively, are the eggs swallowed and passed through the bird's gut untouched and are then deposited on the ground in its poo and eventually hatch? Maybe the mystery has been revealed. What do you think?

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Lois Hughes

Correction: In issue #81 June 2016 – In the Garden – it was said that the "Spotted Katydid, *Ephippitytha trigintiduoguttata"* ate male cicadas. Actually the katydid that has been observed to lure cicadas to their death is the Spotted Predatory Katydid, *Chlorobalius leucoviridis* Tepper.

Also the beetles referred to in the same issue, in the excursion report to the Boondall Wetlands, as Ladybirds were in fact Leaf Beetles (*Dicranosterna* sp. and *Paropsisterna sexpustulata*).

BUTTERFLY AND OTHER INVERTEBRATES CLUB PROGRAMME

Presentation by Michelle Gleeson, author of the recently published book *Miniature Lives* – Identifying insects in your home and garden
When: Tuesday 20th September, 2016 – 6.30 pm for 7 pm start
Where: CWCN Centre, 47 Hepworth St, Chapel Hill (UBD 178 A11)
RSVP: Jutta Godwin ph. 3378 1929

Field Trips organized for the period October to December 2016 - *Paul Klicin* – Field Trip Co-ordinator
RSVP for all events to (07) 3808 2930 Mob: 0411 031 406 - paulez2@hotmail.com

October: (Saturday 15th) – Springbrook National Park
This is a fantastic location and definitely a trip you don't want to miss.
Meet at 10am at Tallabana picnic area which is near Canyon lookout which is off Canyon Parade.
Lunch at midday – Members are requested to pay $5 each before the day (please pay Paul ahead of time so lunch can be arranged and provided) ($10 non-members).
Reasonable level of fitness required for this walk.
Please wear good walking shoes and a hat.
Make sure you bring plenty of drinking water.
Walk will take approximately 2 hours in total then arrive back at the picnic area for lunch.
What we expect to see - Birdwing butterflies, waterfalls, plenty of plant species, ground mullet and invertebrates.
Carpooling recommended. I can take 3 passengers (maybe 4).

November: (Saturday 12th) – Skywalk Mount Tamborine
If you have never been to the Mount Tamborine Skywalk before then you are in for a treat. Meet there at 10am.
I have arranged a group discount for this trip. Cost for all attending is $13.20 per person which is a real bargain and well worth the money as the usual cost is normally $19.20.
There is a café on site if you wish to purchase lunch.
Carpooling recommended. I can take 3 passengers (maybe 4).

December: (Saturday 3rd) – Daisy Hill forest walk
Park across the road from 12 John Markwell Parade. There is no dedicated parking but this is the meeting point. Meet there at 10am.
There is a lot to be seen and a real hotspot of activity for both butterflies and other invertebrates at the edge of the forest. What you may expect to see there: Evening Brown, Leafwing, Monarch, Blue Triangle, Orchard Swallowtail butterflies and their host plants.

DISCLAIMER

The magazine seeks to be as scientifically accurate as possible but the views, opinions and observations expressed are those of the authors. The magazine is a platform for people, both amateur and professional, to express their views and observations about invertebrates. These are not necessarily those of the BOIC. The manuscripts are submitted for comment to entomologists or people working in the area of the topic being discussed. If inaccuracies have inadvertently occurred and are brought to our attention we will seek to correct them in future editions. The Editor reserves the right to refuse to print any matter which is unsuitable, inappropriate or objectionable and to make nomenclature changes as appropriate.

ACKNOWLEDGMENTS

Producing this magazine is done with the efforts of:

- Those members who have sent in letters and articles
- Lois Hughes who provided the cover painting
- Daphne Bowden who works on layout, production and distribution
- John Moss, Rob Whyte and Frank Jordan for scientific referencing and proof reading of various articles in this issue of the magazine

ARE YOU A MEMBER?

Please check your mailing label for the date your membership is due for renewal. If your membership is due, please renew as soon as possible. **Membership fees are $30.00 for individuals, schools and organizations**. If you wish to pay electronically, the following information will assist you: BSB: **484-799**, Account No: **001227191**, Account name: **BOIC**, Bank: **Suncorp**, Reference: your membership number and surname e.g. **234 Roberts.**

Next event – Presentation by Michelle Gleeson**,** author of the recently published book *Miniature Lives* – Identifying insects in your home and garden - Tuesday 20th September, 2016